

Safety insert for single-use disposable syringes

The present invention relates to a safety insert for single-use disposable syringes which can be introduced into the interior thereof.

The use of disposable syringes is currently of great importance for avoiding contagion of infectious diseases, such as hepatitis or AIDS, both for health personnel and actual users of said syringes.

These syringes are very simple in construction since they usually consist of a cylindrical element, generally made of plastics material, which ends at one end in a nozzle and at the other end in a circular opening, and of an internal element which at one end has a plunger which produces a seal and at the other end a base for pushing or pulling same, and a stem which joins the two aforementioned end elements.

In spite of the fact that these disposable syringes, generally made of plastics material, are sold at very low cost and are provided for single use, re-use thereof is frequent, particularly by drug addicts who inject substances intravenously, which involves an obvious and certain risk of infection.

European patent application EP 494 289 A1 describes a single-use syringe in which, by means of radial arms that are sharpened at their ends and articulated to the end of the plunger, it is possible to cut the wall of the syringe cylinder, thus breaking its seal. However, this device has the drawback that the sharp edges project externally and, while

preventing reuse of the syringe, can cause infections owing to potential cuts from said sharp edges.

There are numerous single-use syringes on the market which, after use, impede withdrawal of the interior plunger by mechanical means, many of them fixed to the syringe itself, and thus make their manufacture more expensive.

European patent EP 0 489 750 describes an insert for preventing reuse of plastic syringes. Said element can be inserted through the open end of the syringe between the internal wall of the cylindrical part of the syringe and the stem of the interior plunger. It has several tabs with points or ends which are fixed to the stem and move jointly therewith only when said stem is displaced toward the nozzle, and other tabs with points or ends, of which the inclination is such that they are fixed to the cylindrical wall when the stem is displaced away from the nozzle. A final blocked position of the nozzle is thus achieved after the syringe has been used, thus avoiding a withdrawal movement of said nozzle once the syringe has been emptied, although said construction may be sensitive to slight clearance.

The object of the present invention is to provide a safety insert for disposable syringes which avoids the drawbacks of the prior art and which more reliably prevents re-use of said syringe.

It has been found that this can be achieved with means which, in the event of an attempt to withdraw the plunger after use of the syringe, break the seal of the cylindrical compartment intended to contain the substance for injection.

The invention relates to a safety insert for disposable syringes which comprises at least one perforating means with a point at its end that is capable of penetrating the plunger and passing through its wall, thus breaking the seal of the cylindrical compartment intended to contain the substance for injection when an attempt is made to withdraw the plunger after injection.

Other characteristics and advantages of the present invention will emerge from the detailed description hereinafter which makes reference to the accompanying drawings, in which:

Fig. 1 shows a perspective view of the subject of the present invention,

Fig. 2 shows a perspective view of a syringe in the initial position prior to its use,

Fig. 3 shows a perspective view of the subject of the present invention located on the interior stem and in its initial position prior to use of the syringe, without showing the cylindrical wall element,

Fig. 4 shows a perspective view of a syringe after suction or filling have taken place,

Fig. 5 shows a perspective view of the subject of the present invention located on the interior stem in its position after suction or filling have taken place, without showing the cylindrical wall element,

Fig. 6 shows a perspective view of a syringe in the final empty position,

Fig. 7 shows a perspective view of the subject of the present invention located on the interior stem in its final empty position, without showing the cylindrical wall element,

Fig. 8 shows a perspective view of an insert according to the present invention,

Fig. 9 shows a perspective view of a syringe in the initial position prior to its use,

Fig. 10 shows a perspective view of the subject of Fig. 8 located on the interior stem and in its initial position prior to use of the syringe, without showing the cylindrical wall element,

Fig. 11 shows a perspective view of a syringe after suction or filling have taken place,

Fig. 12 shows a perspective view of the subject of Fig. 8 located on the interior stem in its position after suction or filling have taken place, without showing the cylindrical wall element,

Fig. 13 shows a perspective view of a syringe in the final empty position, and

Fig. 14 shows a perspective view of the subject of Fig. 8 located on the interior stem in the final empty position, without showing the cylindrical wall element.

As can be seen in Fig. 1, the insert 1 shown in this figure has an approximately W-shaped profile and has two pairs of fixing means 3 and perforating means 2, of which two are lateral and one is central, each of them having the shape of a gaff, with their respective points. The profile of the insert 1 can have two symmetrical lateral portions and one central portion capable of settling on one of the longitudinal walls of the stem of the syringe. In said figure it can be seen that the lateral perforating gaffs are adjacent to the respective front fixing gaffs.

Fig. 2 shows a syringe 4 in its initial position prior to its use. Said syringe 4 has a cylindrical wall element 5 which ends at one end in a nozzle 6 and at the other end in a circular opening surrounded by a lower ring 7. The internal element 8 has, at one end, a plunger 10 and at the other end a pushing base 11, both joined by an intermediate stem 9 formed by perpendicular walls 12 with an X-shaped portion. Said stem 9 also contains at least one interior ring 13.

Fig. 3 shows the initial position of the element 1 of Fig. 1 on said stem 9 and without showing the cylindrical wall element 5.

Fig. 4 shows the syringe 4 once suction has been produced, with total withdrawal of the stem 9. On the other hand, Fig. 5 shows the position of the element 1 of Fig. 1 on the interior stem 9 of the syringe 4 once suction has been produced, without showing the cylindrical wall element 5.

Fig. 6 shows the syringe 4 once it has been emptied, with total advancement of the stem 9, and Fig. 7 shows the position of the element 1 of Fig. 1 on the interior stem 9 of the syringe 4 once it has been emptied, without showing the cylindrical wall element 5.

Fig. 8 shows an insert 14 with an approximately V-shaped profile which has a pair of protection plates 15 in its lower part, to prevent manipulations. Each of the two portions of said V is capable of being supported on the respective longitudinal wall 12 of the stem 9 of the syringe 4. In this figure this element also has its perforating gaffs adjacent to the front fixing gaffs.

Fig. 9 to 14 show the positions of the syringe 4 and the insert 14 of Fig. 8 during its use.

Fig. 9 shows a syringe 4 in its initial position prior to its use and Fig. 10 shows the initial position of the element 14 of Fig. 8 on said stem 9 and without showing the cylindrical wall element 5.

Fig. 11 shows the syringe 4 once air intake has been produced, with total withdrawal of the stem 9. On the other hand, Fig. 12 shows the position of the element 14 in Fig. 8 on the interior stem 9 of the syringe once air intake has been produced, without showing the cylindrical wall element 5.

Fig. 13 shows the syringe 4 once it has been emptied, with total advancement of the stem 9, and Fig. 14 shows the position of the element 14 of Fig. 8 on the interior stem 9 of

the syringe 4 once said evacuation has been produced, without showing the cylindrical wall element 5.

The shape of the retention gaffs with their respective points means that during evacuation (advancement of the stem 9), the insert 1, 14 can advance with the stem 9 but cannot move backwards, owing to the fact that its retention gaffs 3 impede said withdrawal by penetrating in the internal wall of the cylindrical element 5 of the syringe 4.

Therefore, on arriving at the final evacuation position the stem 9 with the insert 1, 14 cannot move backwards and said insert 1, 14 will remain in its end position. If there is any attempt to pull the stem 9 back with the intention of re-using the syringe 4, the perforating gaff 2 will penetrate on the plunger 10, passing through its wall and thus breaking the seal of the syringe 4.

It is obvious that modifications can be made to the invention within the scope thereof, without the invention having to be considered limited to the embodiment described but only to the content of the following claims.